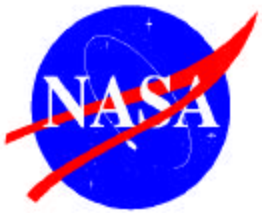

National Aeronautics and
Space Administration

NOT MEASUREMENT SENSITIVE

NASA-STD-2808A
January 23, 1998

INTEROPERABILITY PROFILE FOR NASA E-MAIL CLIENTS

NASA TECHNICAL STANDARD

FOREWORD

This standard is approved for use by NASA Headquarters and all NASA Centers and is intended to provide a common framework for consistent practices across NASA programs.

The material covered in this standard is based on the consensus judgment of the NASA Chief Information Officer (CIO) Representatives Board and the NASA CIO Council. The purpose of this standard is to define the list of E-mail interoperability interface requirements for the Agencywide electronic mail system.

Requests for information, corrections, or additions to this standard should be directed to Marshall Space Flight Center (MSFC), the Principal Center for Communications Architecture, Code AI51, Huntsville, AL, 35812. Requests for additional copies of this standard should be sent to NASA Engineering Standards, EL01, MSFC, AL, 35812 (telephone 205-544-2448).

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Chief Information Officer

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INTEROPERABILITY PROFILE FOR NASA E-MAIL CLIENTS

1. SCOPE

1.1 Purpose. The purpose of this standard is to define the list of E-mail interoperability interface requirements for the Agencywide electronic mail system.

1.2 Scope. The requirements are divided into categories which will be used as selection criteria for E-mail clients, servers, and gateways, as applicable. The categories are as follows:

- Mandatory: This criterion must be supported. Lack of support for this criterion disqualifies a product.

- Preferred: This criterion is of substantial benefit. Products that support this standard will be preferred over products that do not.

- Optional: This criterion is not essential; however, “nice to have”. It represents some added value, but is a less significant criterion than the above.

The list of requirements will be maintained by the Postmasters Working Group and revised quarterly or as needed to meet the evolving needs of the Agency.

2. ACRONYMS

2.1	ASCII	American Standard Code for Information Interchange
2.2	DNS	Domain Name System
2.3	E-Mail	Electronic Mail
2.4	EHLO	Extended Hello
2.5	GIF	Graphic Interchange Format
2.6	IANA	Internet Assigned Numbers Authority
2.7	JPEG	Joint Photographic Experts Group
2.8	MIME	Multipurpose Internet Mail Extension
2.9	MPEG	Moving Picture Expert Group
2.10	RFC	Request for Comment
2.11	SMTP	Simple Mail Transfer Protocol
2.12	TIFF	Tagged Image File Format

3. DETAILED REQUIREMENTS

3.1 Simple Mail Transfer Protocol (SMTP) Header Integrity (Mandatory). All components should properly support SMTP protocols and message formats (RFC-821, RFC-822). This includes retention of all headers and respect of all standards-defined headers. Regardless of whether an E-mail header is recognized, it should not be deleted from the message.

The following is the list of mail headers from RFC-822 that should be recognized:

Return-path:, Received:, Reply-to:, From:, Sender:, Date:, To:, Cc:, Bcc:, In-Reply-To:, References:, Keywords:, Subject:, Comments:, Encrypted:, Resent- (multiple formats), and X- (user-defined format).

3.2 Domain Name Service (DNS) Support (Mandatory). All components should either fully support correct E-mail routing via the DNS, RFC-1034 and RFC-974, or they should fully delegate E-mail routing to a component that does. If the product does DNS resolution, it must do it correctly, including proper support of "MX" records.

3.3 Compatibility with SMTP Service Extensions (Mandatory). All components should either fully support the SMTP Service Extensions (RFC-1651, RFC-1652, RFC-1653), or they should reject the associated "extended hello" (EHLO) command without crashing, hanging, dropping the connection, terminating the conversation, or otherwise malfunctioning. If the extensions are not supported, the correct protocol should be to reject "EHLO" as an unknown command and to then accept the "HELO" that follows and continue with the SMTP conversation.

3.4 Minimum MIME Support(Mandatory). All components should comply to the minimum standards of the Multipurpose Internet Mail Extensions (MIME) as outlined in Appendix A of RFC-1521. See the RFC text for details. The requirements are summarized below:

- Support of the "MIME-Version: 1.0" header.
- Support of the "Content-Transfer-Encoding:" header, and the base64 and quoted-printable encodings.
- Support of the "Content-Type:" header, such that raw nontextual information is not displayed and character sets other than US-ASCII are correctly identified.
- Minimum support requirements for content types of "text", "message", "multipart", and "application".
- Correct handling of an unknown content type.

3.5 Supported Registered MIME Types (Mandatory). All components should fully support and use the registered MIME attachment types and subtypes (sending and receiving, unless otherwise noted) identified in Table I.

All components should specify and recognize the file types identified in the table below and specify the corresponding MIME types Agencywide. For example, when sending a JPEG file, the component should identify the content type as "image/jpeg", and when receiving a message part typed "application/msword", the component should recognize it as a Microsoft Word document and display or save it as such. This list should contain file types that are useful on more than one platform.

The subtypes of "x-msexcel" and "x-mspowerpoint" are fabricated local types, beginning with "x-" as allowed by the MIME standard. These will be retained for a predefined interval, ultimately replaced with the new corresponding registered MIME types. The transition period, not to exceed one year from formal update of the standard MIME profile, will be defined by the NASA Postmaster's Working Group and coordinated with appropriate support group(s) at each Center.

Implicit in this requirement is the ability to define local MIME types and subtypes and map them to corresponding file types and applications. For example, a new word processor might be

assigned a MIME type of application/x-newwp, and attachments of that type should be directed to the “newwp” program on the recipient’s machine.

TABLE I. Supported MIME Types & File Type Mappings

FILETYPE	PLATFORM	MAPPING (type/subtype)	DIRECTION	RECOMMENDED OR AGENCY STANDARD
Simple ASCII	PC, MAC, UNIX	text/plain	both	Word Perfect or MS Word or text editor
Enriched Text	PC, MAC, UNIX	text/enriched	in	Email client
Hypertext Markup Language (HTML)	PC, MAC, UNIX	text/html	both	Netscape
Multiple parts with independent data types	PC, MAC, UNIX	multipart/mixed	both	N/A
MAC file with data fork and resource fork	PC	multipart/appledouble	in	N/A
	MAC	multipart/appledouble	both	N/A
Encapsulated message with syntax of RFC822 message	PC, MAC	message/rfc822	both	N/A
Uninterpreted binary data	PC, MAC, UNIX	application/octet-stream	both	N/A
Page description language used for high-quality printing on high resolution printing devices	PC, MAC	application/postscript	both	none identified
	UNIX	application/postscript	both	Ghostscript
Macintosh executable programs	MAC	application/applefile	both	N/A
Novell WordPerfect; word processing	PC, MAC	application/wordperfect5.1	both	Word Perfect or MS Word
Adobe Acrobat, Portable Document Format (PDF)	PC, MAC, UNIX	application/pdf	both	Adobe Acrobat
	PC, MAC	application/x-acrobat	in	Adobe Acrobat

TABLE I. Supported MIME Types and File Type Mappings (Cont'd)

FILETYPE	PLATFORM	MAPPING (type/subtype)	DIRECTION	RECOMMENDED OR AGENCY STANDARD
Compressed files using PKZIP	PC	application/zip	both	WinZip
Microsoft Word; word processing	PC, MAC	application/msword	both	MS Word or Word Perfect
Microsoft Excel; spreadsheet	PC, MAC	application/x-msexcel	in	MS Excel or Lotus 123
	PC, MAC	application/vnd.ms-excel	both	MS Excel or Lotus 123
Microsoft Powerpoint; presentation graphics	PC, MAC	application/x-mspowerpoint	in	MS Powerpoint
	PC, MAC	application/vnd.ms-powerpoint	both	MS Powerpoint
Microsoft Project; project management	PC, MAC	application/x-msproject	in	not identified in NASA STD-2804
Microsoft Project; project management	PC, MAC	application/vnd.ms-project	both	not identified in NASA STD-2804
Compressed graphics format used for complex pictures, including photographs; standard developed by the Joint Photographic Experts Group (JPEG)	PC, MAC	image/jpeg	both	Netscape
	UNIX	image/jpeg	both	ImageMagick
Compressed graphics format, Graphics Interchange Format (GIF) originally developed by Compuserve	PC, MAC	image/gif	both	Netscape
	UNIX	image/gif	both	ImageMagick
Graphics file; Tagged Image File Format (TIFF) for scanned photographic images	PC, MAC	image/tiff	both	not identified in NASA STD-2804
	UNIX	image/tiff	both	ImageMagick

TABLE I. Supported MIME Types and File Type Mappings (Cont'd)

FILETYPE	PLATFORM	MAPPING (type/subtype)	DIRECTION	RECOMMENDED OR AGENCY STANDARD
Compressed graphics; Portable Network Graphics (PNG); designed for online viewing applications	PC/MAC	image/png	both	not identified in NASA STD-2804
Single channel audio	PC, MAC	audio/basic	both	not identified in NASA STD-2804
Compressed video for digitized videos and animations using Moving Picture Experts Group (MPEG) standard	PC	video/mpeg	both	VMPEG Lite
	MAC	video/mpeg	both	Sparkle
	UNIX	video/mpeg	both	mpeg_play
Animated or video sequences synchronized with high-quality digital sound	PC	video/quicktime	both	Quicktime
	MAC	video/quicktime	both	Sparkle
	UNIX	video/quicktime	both	not yet specified
Shana InFormed Electronic Forms application	PC, MAC	application/vnd.shana.informed.formtemplate	both	Shana Informed
Shana InFormed Electronic Forms application	PC, MAC	application/vnd.shana.informed.formdata	both	Shana Informed
Shana InFormed Electronic Forms application	PC, MAC	application/vnd.shana.informed.package	both	Shana Informed
Shana InFormed Electronic Forms application	PC, MAC	application/vnd.shana.informed.interchange	both	Shana Informed

Note: The Recommended or Agency Standard column identifies software products adopted or recommended as NASA agency standards per NASA-STD-2804 for Windows/MAC desktops and per NASA-STD-2810 for UNIX desktop systems. For specific version levels adopted, refer to specific documents posted to the NASA Technical Standards Web site at http://standards.nasa.gov/masterlist.htm#2000.

3.6 Respect Of IANA MIME Types (Mandatory). Components should never generate unregistered MIME types without prefixing them with "x-", as defined in the MIME standard. Components should never generate MIME types incorrectly, i.e., for the incorrect type of file or with in the incorrect format.

3.7 Creating Recognizable Files (Mandatory). When saving MIME types into a native format, the component should generate applicable file-type information wherever possible (e.g., type/creator in Macintosh or 3-character file extension in DOS/Windows) so that the recipient system will recognize the type of the file.

3.8 Macintosh Attachment Support (Mandatory).

3.8.1 Sending. Macintosh computers should transmit attachments with the multipart/appledouble MIME type. This format permits receiving Macintosh computers to recover all file information, while computers of other platforms can recover the portion of the data that is generally usable.

Macintosh computers may also transmit attachments using the other MIME types specified, provided the loss of the Macintosh-specific information caused by this method is not significant (i.e., does not impair the usefulness of the file).

Conversely, when sending files that are only usable by another Macintosh (e.g., executable programs), Macintosh computers may use the application/applefile MIME type.

3.8.2 Receiving. Non-Macintosh platforms should be able to process incoming attachments in multipart/appledouble format to the following extent:

- The two parts should be recognized.
- Any transfer encoding should be decoded (e.g., base64).
- The generally usable part should be presented to the user as an attachment, in the same way as other attachments.
- Ideally, the Macintosh-specific part should be discarded on platforms that do not support it, not presented to the user as usable data.

Macintosh platforms should be able to process both parts of the multipart/appledouble structure and reconstruct the Macintosh file in its entirety. Implicit in this is the receiving Macintosh's ability to process the application/applefile MIME type.

3.9 File Name Encoding/Decoding (Mandatory). MIME components should look for the attachment's original file name in two locations:

- As a "name=" parameter to the "Content-type:" record (RFC-1341, replicated in RFC-1521).
- As a "filename=" parameter to the "Content-Disposition:" record. (RFC-1806, standards-track but "experimental").

The "Content Disposition:" record (RFC-1806) is the planned method for conveying attachment file names in MIME. MIME components should generate this format, but generation of the replicated format may also be acceptable at this time.

4. DURATION

4.1 Duration. This standard will remain in effect until canceled or modified by the NASA CIO.